Claims

1. An adsorbent for removing a sulfur compound contained in a hydrocarbon fuel, characterized in that the adsorbent comprises cerium oxide.

2. An adsorbent for removing a sulfur compound as described in claim 1, wherein the adsorbent has a specific surface area of 20 m^2/g or more.

3. An adsorbent for removing a sulfur compound as described in claim 1, wherein the adsorbent has a specific surface area of 50 m^2/g or more.

4. An adsorbent for removing a sulfur compound as described in claim 1, wherein the cerium oxide has a mean crystallite size of primary particles of 10 nm or less.

5. An adsorbent for removing a sulfur compound as described in claim 1, wherein the cerium oxide exhibits a cumulative hydrogen consumption, as calculated up to 600°C in a temperature-programmed reduction test, of 200 μmol/g or more.

6. An adsorbent for removing a sulfur compound as described in claim 1, wherein the cerium oxide exhibits a cumulative hydrogen consumption, as calculated up to 600°C in a temperature-programmed reduction test, of 300 μmol/g or more.

7. An adsorbent for removing a sulfur compound as described in claim 1, wherein the adsorbent contains a mixture of cerium oxide and at least one oxide selected from

among Al_2O_3, SiO_2, TiO_2, ZrO_2, and MgO.

8. An adsorbent for removing a sulfur compound as described in claim 1, wherein the adsorbent further contains at least one element selected from among the elements belonging to Groups 1 to 15 in the periodic table, said at least one element being carried on cerium oxide.

9. An adsorbent for removing a sulfur compound as described in claim 8, wherein the cerium oxide on which at least one element selected from among the elements belonging to Groups 1 to 15 in the periodic table is carried is calcined at 400°C or lower.

10. An adsorbent for removing a sulfur compound as described in claim 8, wherein the amount of a carried compound, as reduced to the corresponding metallic element, of at least one element selected from among the elements belonging to Groups 1 to 15 in the periodic table is 1 to 90 mass% with respect to the entire amount of the adsorbent.

11. An adsorbent for removing a sulfur compound as described in claim 1, wherein the cerium oxide is a complex oxide containing cerium, and at least one metallic element other than cerium selected from among the elements belonging to Groups 2 to 16 in the periodic table.

12. An adsorbent for removing a sulfur compound as described in claim 1, wherein the hydrocarbon fuel is LPG, town gas, natural gas, naphtha, kerosene, gas oil, or at least one hydrocarbon compound or oxygen-containing hydrocarbon compound selected from among ethane, ethylene,

propane, propylene, butane, butene, methanol, and dimethyl ether.

13. A process for producing hydrogen, characterized in that the process comprises desulfurizing a hydrocarbon fuel through removal of a sulfur compound contained in a hydrocarbon fuel by use of an adsorbent as recited in claim 1 and, subsequently, bringing the fuel which has been desulfurized into contact with a partial-oxidation reforming catalyst, an authothermal reforming catalyst, or a steam reforming catalyst.

14. A process for producing hydrogen as described in claim 13, wherein the partial-oxidation reforming catalyst, the authothermal reforming catalyst, or the steam reforming catalyst contains ruthenium or nickel.

15. A process for producing hydrogen as described in claim 13, wherein desulfurizing is performed while neither hydrogen nor oxygen is added.

16. A process for producing hydrogen as described in claim 13, wherein the sulfur compound is at least one species selected from among carbonyl sulfide, carbon disulfide, hydrogen sulfide, mercaptans, sulfides, and thiophenes.

17. A process for producing hydrogen as described in claim 13, wherein desulfurizing is performed at 200°C or lower.

18. A process for producing hydrogen as described in claim 13, wherein desulfurizing is performed at 100°C or lower.

19. A fuel cell system characterized by employing hydrogen produced through a process for producing hydrogen as recited in any of claims 13 to 18.